A critical appraisal of "Community-based group exercise for persons with Parkinson disease: A randomized controlled trial"

By

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Abstract

The purpose of this critical appraisal was to answer the clinical question: Are non-contact boxing-style fitness programs effective treatments for improving balance and functional mobility in patients with Parkinson's disease? A literature search was first conducted through a variety of databases. The article chosen was then assessed and the strengths and weaknesses were identified. The article chosen, "Community-based group exercise for persons with Parkinson disease: A randomized controlled trial," concluded that non-traditional boxing training did have significant improvements on outcome measures in individuals with PD. Each section of the article was critically appraised, and it was found that the validity of the research study is creditable, and that the strengths of the article outweigh the weaknesses.

Key words

Critical appraisal, Parkinson's disease, boxing, group exercise, balance

Introduction

Parkinson's disease (PD) is currently affecting many individuals across the nation, particularly in their ability to function. This paper is meant to critically appraise an article focused on persons with Parkinson's disease and is important because it will determine the strengths and weaknesses of the overall study and conclude if the interventions explored are applicable in the clinical setting. Although the article being appraised provides non-contact boxing-style fitness programs and traditional group exercise as interventions, the clinical question aimed to answer is: Are non-contact boxing-style fitness programs effective treatments for improving balance and functional mobility in patients with Parkinson's disease?

Methods

The literature search process was long but quite efficient. Several databases were used but the keywords utilized across all the databases were 'boxing AND Parkinson's'. The databases used in the process were the U.S. National Library of Medicine: PubMed, Academic Search Complete, and Cumulative Index of Nursing and Allied Health Literature (CINAHL) Complete. The only limit placed in this literature search was the year of publication. Boxing training as a method to influence people diagnosed with Parkinson's disease is relatively novel. Therefore, recent data within the past decade was desired so a filter for articles from 2010 to the present was placed. Regarding interventions, anything boxing-related would be included, and the populations included would be individuals with PD. Other interventions could potentially be included, such as traditional exercise programs or other methods of exercising, to compare to boxing-style fitness programs. Since the keywords utilized consist of Parkinson's, other disorders influenced by boxing-style fitness programs are most likely to be excluded. About 30 hits were expected before ending the literature search and beginning the process of reviewing

articles and once the year of publication limit was placed, from 2010-present, slightly under 40 hits were obtained which was suitable.

The final article chosen was "Community-based group exercise for persons with Parkinson disease: A randomized controlled trial." The article was published in 2013 and the source of journal is NeuroRehabilitation. The study was performed through the Krannert School of Physical Therapy, at the University of Indianapolis, in the United States. The authors of the article are Stephanie A. Combs (corresponding author), M. Dyer Diehl, Casey Chrzastowski, Nora Didrick, Brittany McCoin, Nicholas Mox, William H. Staples, and Jessica Wayman. This article was chosen for a comprehensive critical appraisal because its credibility was found to be adequate. The study conducted a single-blind, randomized controlled trial and provided information on subject attrition.

Results

Summary of the study

The purpose of the study was to compare the effects of traditional group exercise to non-traditional group boxing training on balance, functional mobility, and quality of life. Thirty-one participants were randomly assigned to either traditional group exercise or non-traditional boxing training, both programs consisting of 24-36 sessions, 90 minutes each. Data was collected a week prior to beginning the assigned training and within one week after the training program was over. A variety of outcome measures were used including the Berg Balance Scale (BBS), Timed Up and Go (TUG), and 6-Minute Walk Test (6MWT). It was discovered that the traditional exercise group demonstrated significantly greater gains in balance confidence compared to the non-traditional boxing training group, but only the boxing group demonstrated meaningful improvements in gait velocity and endurance. Both groups displayed significant

improvements in balance, functional mobility, and quality of life. Substantially, this study was the first clinical trial to compare non-traditional group boxing training to traditional group exercise in individuals with PD.

Appraisal of the study introduction

The introduction is very comprehensive, provides the necessary background information, and does a good job presenting and explaining the research study. It provides the purpose, and it uses previous literature to form a thorough justification for the study. The keywords of the paper were Parkinson disease, boxing, balance confidence, exercise, and quality of life, and majority of the keywords were addressed sufficiently. Overall, the introduction is clear and well-written.

Although all previous literature mentioned is accessible, some of the literature is older and ranges back to the early 1990's. Something else to note is that one of the keywords listed, balance confidence, is not addressed enough in the introduction. Balance is mentioned thoroughly but balance confidence is not, and those two concepts are not interchangeable.

Appraisal of the study methods

The study contained a strong research design as it was a prospective, single-blind, randomized controlled trial (RCT) and its duration consisted of a longitudinal design. They started with fifty-two potential participants but only thirty-one met the criteria which is a good amount. Fourteen individuals were assigned to the traditional exercise group and seventeen to the non-traditional boxing group, and both between-subjects and within-subjects effect sizes were analyzed. Another strength of the study is that each subject's group assignment was randomly assigned using a concealed block randomization procedure, but the investigators had to be aware

of each subject's group assignment thereafter. Subjects were also not masked to their group assignment as the intervention they were assigned to had to be known, but the outcome assessors were masked to each subject's group assignment. This study was also set up in a way to minimize sociodemographic, clinical, and prognostic characteristics prior to beginning the study through inclusion and exclusion criteria. There were no statistically significant differences found between the two intervention groups and the investigators did a good job in managing both groups the same way, except for the experimental intervention. The reliability and validity of the instruments used in the study to measure outcomes were also described in sufficient detail and were supported by other research articles.

A huge weakness of the study is that out of the thirty-one subjects, nine subjects dropped out reducing the sample size to twenty-two subjects. Most attrition was due to schedule conflicts, health status changes, and dislike for their assigned exercise group. This can affect the findings by skewing the results in either group since pre-test scores for those who withdrew were carried forward at post-test results. Although the interventions are clearly described and in enough detail for replication, the only limitation is that the investigators did not design the boxing training program.

Appraisal of the study results

The results section of the study is not presented in the same order as the research questions are asked, but the results are still written in an organized and clear manner. They organized by showing the most significant findings first, which were very easy to follow and understand as the authors referred to the tables provided. They also address the research questions by analyzing all the outcome measures. The authors did a great job reporting all the

outcome measures presented in the methods section and the figures and tables are clear and accurate for the reader to understand. The authors also do a good job at clarifying that the threshold of the p-value was set at $p \leq 0.025$. The results section explains the most important finding, that the traditional exercise group demonstrated significantly greater gains in balance confidence. They also do a good job mentioning that only the boxing group demonstrated significant results in gait velocity and endurance.

Some weaknesses of the results section are that the authors don't mention anything about the minimal clinically important difference (MCID) before analyzing the data or the number needed to treat (NNT). Also, the parameter of confidence intervals are not specifically stated, but I would assume is 97.5% since the p-value is 0.025.

Appraisal of the study discussion

The discussion section was well-written. The investigators addressed their hypothesis and state that their hypothesis has been refuted. The authors further indicated the meaning of their findings by providing additional possible explanations. For example, they stated that people in the traditional exercise group may have gained more balance confidence since the exercise program focused specifically on balance skills exercises. The authors also tied their findings to existing literature, and they recognized limitations to their study such as an unexpected high attrition rate. The conclusions are concise, reflective of the results, and the authors did not over conclude their findings. The authors also provided future study suggestions and addressed the application of the study.

The discussion section was overall great, and no evident weaknesses were found.

Discussion

The clinical significance of this study to current PT practice is to allow the physical therapist to consider other options for long-term community-based exercise. This study is relevant to my clinical question, declaring that non-contact boxing-style fitness programs are an effective treatment for improving balance and functional mobility in patients with PD.

Non-contact boxing-style fitness training should not be used greatly in the clinic, but it would be good to consider for patients interested, as part of a warm-up session, and it would be a great way to engage with the patient. As the study's findings show, the boxing group demonstrated significant improvements in six out of seven outcome measures. The only outcome measure not improved was balance confidence and it should be emphasized that only the boxing group demonstrated significant results in gait velocity and endurance. There are no apparent risks for the patient in providing a couple of minutes of non-contact boxing-training in the clinic, therefore the potential benefits outweigh the risks. A plan for appropriate and basic training for physical therapists to engage in this type of treatment for patients with PD would improve the argument favoring the boxing training intervention.

The study provided thoughts on the application of the study, and it mentioned that group boxing training or other methods for long-term exercise should be considered, and when thinking about any patient's future I agree that this should be well-thought-out. I have enough confidence in the research validity of this paper to consider mentioning boxing training to any future client diagnosed with PD. Through the process of this critical appraisal, I have learned what the study does well and what it does not, and although there are a few things the study should have mentioned, I still believe the strengths outweigh the weaknesses by far. I can anticipate implementing the intervention safely and appropriately in a clinical setting given my knowledge,

skill levels and resources in the future. I used to do the training myself when I was competing in amateur boxing and I have volunteered in a boxing training program specifically designed for individuals with PD, so I believe I have enough knowledge and resources to my advantage.

The critical appraisal for this article allows for the strengths and weaknesses to be noted and appreciated. It mentions what the authors could have done better to enhance the study and it points out what was done very well. It was found that the validity of the research study is creditable and that the strengths of the article outweigh the weaknesses. The appraised intervention, non-contact boxing-style training, was found to be an effective treatment for improving balance and functional mobility in patients with PD.